

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representation of
The original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

(12) **UK Patent Application** (19) **GB** (11) **2 247 899 A** (13)
(43) Date of A publication 18.03.1992

(21) Application No 9117827.7

(22) Date of filing 16.08.1991

(30) Priority data

(31) 9017987

(32) 16.08.1990

(33) GB

(71) Applicant

Gripple Limited

(Incorporated in the United Kingdom)

Unit 3, Birley Vale Close, Sheffield, S12 2DB,
United Kingdom

(72) Inventors

Peter John Charles Gough

Brian Edward Shawcross

(74) Agent and/or Address for Service

Hulse & Co

**Cavendish Buildings, West Street, Sheffield, S1 1ZZ,
United Kingdom**

(51) INT CL⁴

F16G 11/02, F16B 7/04, H01R 4/48

(52) UK CL (Edition K)

D1T T3B2

F2G GRX GR2

H2E EEGK EEKH E161

U1S S1775 S2067

(56) Documents cited

GB 1587041 A US 4084876 A

(58) Field of search

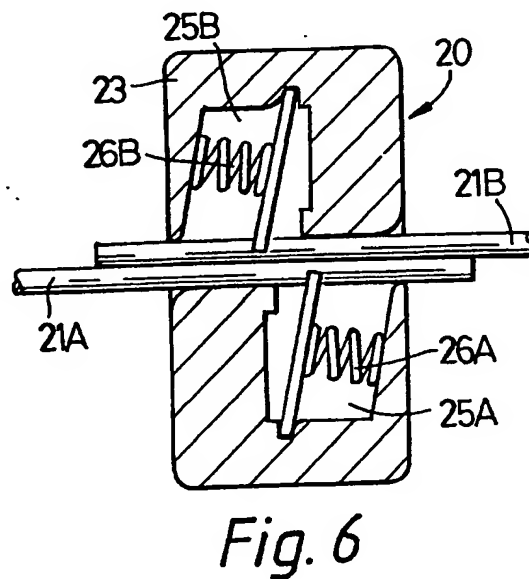
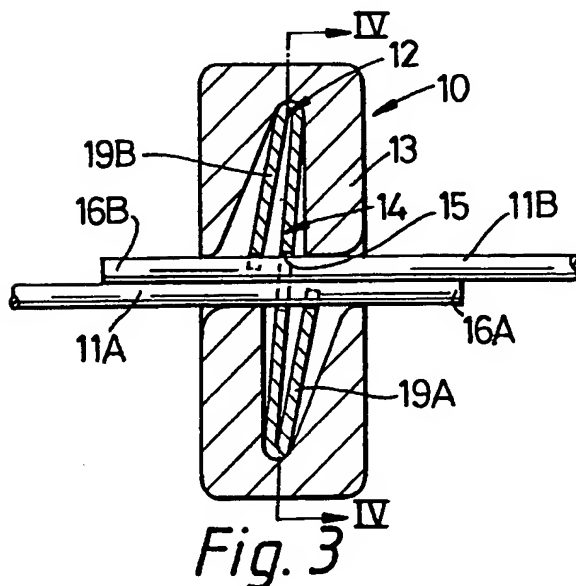
UK CL (Edition K) D1T, F2G, H2E

INT CL⁴ F16G, H01R

Online databases : WPI

(54) Connector for wires

(57) A connector for wires 11A, 11B Figure 3, comprises spring steel strip 12 bent into the form of a Z (or N) housed in a hollow body 13 with the diagonal 14 constrained against rotation in the mid-plane of the Z (or N). The diagonal has a central aperture 15 allowing passage of oppositely directed wire end portions 16A, 16B passing through the body. The arms 19A, 19B of the spring are so biased that attempted withdrawal of either wire end portion is prevented by gripping action between the end of the respective arm and that end portion. Notches are provided in the ends of the arms for positive location with respective wire ends and to enhance the gripping action by increased edge and wire engagement. Alternatively, Fig. 6, the wire ends are gripped by the ends of spring-biased members. The connector may be used with electric fence wire or electric cables.



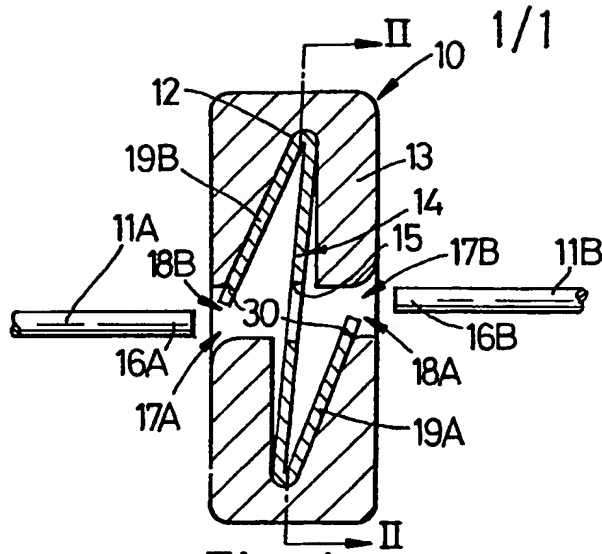


Fig. 1

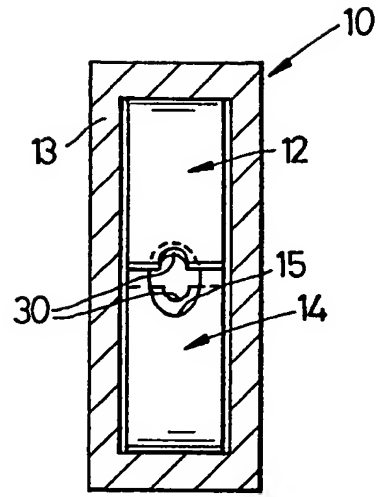


Fig. 2

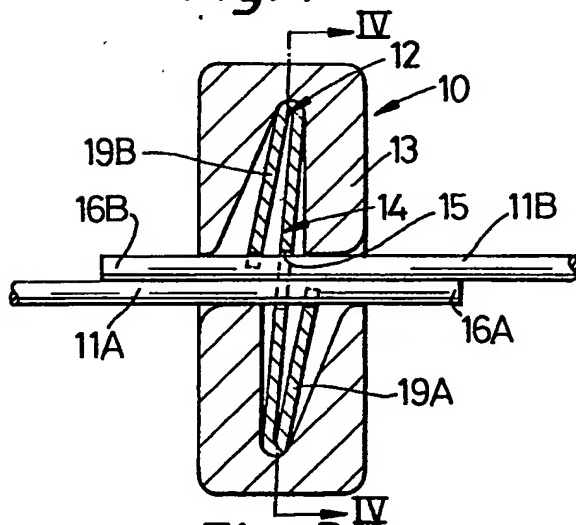


Fig. 3

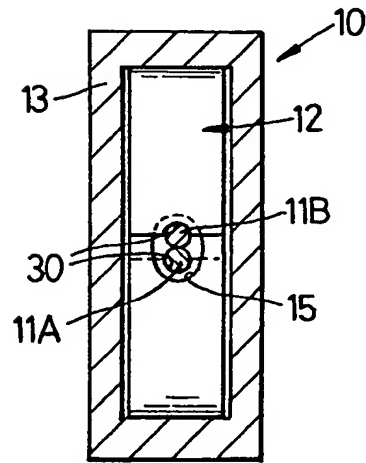


Fig. 4

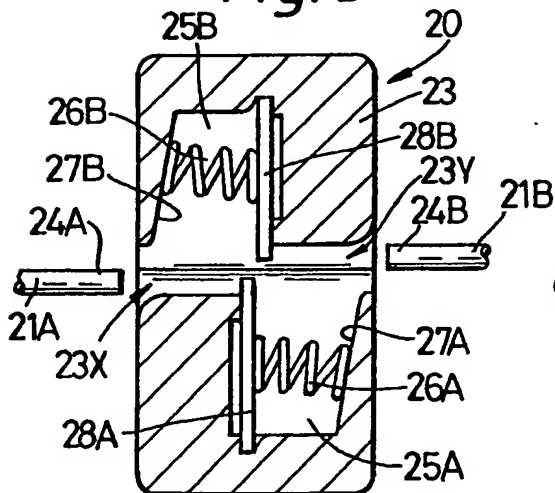


Fig. 5

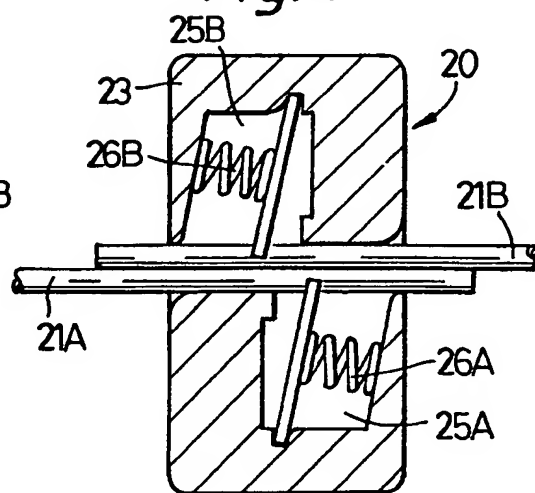


Fig. 6

1

CONNECTOR FOR WIRES ETC.

This invention relates to a connector for wires or the like, e.g., cables or strands, and more particularly - but not exclusively - for connecting together lengths of wire fencing, 5 e.g., by connecting together corresponding line wires, or fencing wires, e.g., of any stock fence, or wires in vineyards.

An object of the invention is to provide a connector enabling wires to be connected together without being twisted, 10 braided or welded.

Another object is to provide a connector not requiring use of any tools or at least any special or custom made tools.

Another object is to provide a connector affording a tensile strength greater than that of most fence wires.

15 Another object is to provide a connector enabling adjustment of tension in the wires being connected.

Another object is to provide a connector adapted for use with different and/or differing diameters of wires or the like.

20 Another object is to provide an electrically conductive connector particularly suitable for use in electric fences or with electric cables.

Another object is to provide a single durable connector capable of withstanding extremes of weather 25 conditions.

According to one aspect of the present invention, a connector for wires (or the like) comprises a length of spring

steel strip bent into the form of a Z (or N) with aligned holes in the diagonal and the arms (or limbs) to receive a pair of oppositely directed wire end portions, the size and/or shape of the holes, and/or spring biasing of the arms (or limbs) being such that attempted withdrawal of either wire end portion is prevented by gripping action between the respective hole in the respective arm (or limb) and that wire end portion.

The wires (or the like) can be pushed through the connector and/or pulled from their ultimate ends to whatever extent is needed to ensure the requisite tension when the wires ease back to be held by the holes in the spring-biassed arms (or limbs).

The direction of spring-biasing of the arms (or limbs) is preferably such that tension in the wire end portions will cause them to move closer together, even to the extent of making contact in a single hole in the diagonal of the Z (or N), thus enabling the wires to be connected together in close alignment.

The connector may be housed in a plastics or, preferably, metal, e.g., die-cast, interengaging two-part housing provided in one or both parts with location surfaces for the connector and entry and exit holes for wire ends (in register with those in the connector). The entry holes preferably diverge outwardly to identify these holes and facilitate insertion of wire ends.

According to another aspect of the present invention, a connector for wires (or the like) comprises a length of

spring steel strip having a central aperture, and a spring steel element held captive within the aperture, with two openings formed between the end portions of the element and the ends of the aperture to receive a pair of oppositely
5 directed wire end portions, insertion of the wire end portions being effective to bias the spring steel element so that attempted withdrawal of either wire end portion is prevented by gripping action between the respective edges of the respective opening.

10 This connector too may be housed in a plastics or metal housing similar to that described above.

According to a further aspect of the invention, a connector for wires (or the like) comprises a length of spring steel strip bent into the form of a Z (or N) housed in a
15 hollow body with the diagonal of the Z (or N) constrained against rotation in the mid-plane of the Z (or N), the diagonal having a central aperture allowing passage of oppositely directed wire end portions passing between respective entry and exit holes in opposite sides of the body,
20 and the arms (or limbs) of the Z (or N) being biased so that attempted withdrawal of either wire end portion is prevented by gripping action between the end of the respective arm (or limb) and that wire end portion.

The ends of the arms (or limbs) are preferably
25 provided with semicircular or V-shaped notches for positive location with respective wire ends and enhancing the gripping action by increased edge and wire engagement.

The body may be of similar material and construction

to the housings described above.

According to yet another aspect of the present invention, a connector for wires (or the like) comprises a hollow body having aligned openings in opposite sides for the
5 passing therethrough of oppositely directed wire end portions, and a pair of spring devices located in pockets in the body and biased so that attempted withdrawal of either wire end portion is prevented by gripping action between the respective spring device and an abutment facing the respective pocket.

10 This body too may be of similar material and construction to the housings described above.

Each spring device may be formed by a bent spring steel strip one limb of which bears against a side of the respective pocket to urge the free end of the other limb
15 towards the respective abutment. Alternatively, each spring device may comprise a compression spring between a side of the respective pocket and a lever arm having one end pivoted in a back corner of the pocket and the other end urged towards the respective abutment. The wire engaging ends of the limbs or
20 arms are preferably provided with semicircular or V-shaped notches for positive location with respective wire ends and enhancing the gripping action by increased edge and wire engagement.

Two embodiments of the invention will now be
25 described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a cross-section through a connector in accordance with the second aspect of the invention;

Figure 2 is a section on the lines II-II of Figure 1;

Figure 3 corresponds to Figure 1 but shows wires held in the connector;

Figure 4 is a section on the line IV-IV of Figure 3;

5 Figure 5 is a cross-section through a connector in accordance with the third aspect of the invention; and

Figure 6 corresponds to Figure 5 but shows wires held in the connector.

In the embodiment shown in Figures 1 to 4 a connector
10 for wires 11A, 11B comprises a length of spring steel strip 12 bent into the form of a Z (or N) housed in a hollow body 13 with the diagonal 14 of the Z (or N) constrained against rotation in the mid-plane of the Z (or N), the diagonal 14 has a central aperture 15 allowing passage of oppositely directed
15 wire end portions 16A, 16B passing between respective entry and exit holes 17A, 17B and 18A, 18B in opposite sides of the body 13, and the arms (or limbs) 19A, 19B of the Z (or N) being biased so that attempted withdrawal of either wire end portion 16A, 16B is prevented by gripping action between the
20 end of the respective arm (or limb) 19A, 19B and that end portion.

In the embodiment shown in Figures 5 and 6 a connector
20 for wires 21A, 21B comprises a hollow body 22 having aligned openings 23X, 23Y for the passage therethrough of
25 oppositely directed wire end portions 24A, 24B and a pair of spring devices located in pockets 25A, 25B in the body, each spring device comprising a compression spring 26A, 26B between a side 27A, 27B of a respective pocket 25A, 25B and a lever

arm 28A, 28B having one end pivoted in a back corner of the pocket and the other end urged towards the respective abutment.

In both embodiments notches 30 are provided in the
5 ends of the arms 19A, 19B and the wire engaging ends of the lever arms 28A, 29 for positive location with respective wire ends and to enhance the gripping action by increased edge and wire engagement.

CLAIMS

1. A connector for wires (or the like) comprising a length of spring steel strip bent into the form of a Z (or N) with aligned holes in the diagonal and the arms (or limbs) to receive a pair of oppositely directed wire end portions, the
5 size and/or shape of the holes, and/or spring biasing of the arms (or limbs) being such that attempted withdrawal of either wire end portion is prevented by gripping action between the respective hole in the respective arm (or limb) and that wire end portion.
- 10 2. A connector for wires (or the like) as claimed in Claim 1, wherein the connector is housed in a housing.
3. A connector for wires (or the like) as claimed in Claim 2 wherein the housing is made of plastics.
4. A connector for wires (or the like) as claimed in
15 Claim 2 wherein the housing is made of metal.
5. A connector for wires (or the like) as claimed in Claim 4, wherein the housing is a die-cast, interengaging two-part housing provided in one or both parts with location surfaces for the connector and entry and exit holes for wire
20 ends.
6. A connector for wires (or the like) as claimed in any one of Claims 2 to 5, wherein the entry holes diverge outwardly.
7. A connector for wires (or the like) comprising a
25 length of spring steel strip having a central aperture, and a spring steel element held captive within the aperture, with two openings formed between the end portions of the element

and the ends of the aperture to receive a pair of opposit ly directed wire end portions, insertion of the wire end portions being effective to bias the spring steel element so that attempted withdrawal of either wire end portion is prevented
5 by gripping action between the respective edges of the respective opening.

8. A connector for wires (or the like) as claimed in Claim 7, wherein the connector is housed in a housing.

9. A connector for wires (or the like) as claimed in
10 Claim 8, wherein the housing is made of plastics.

10. A connector for wires (or the like) as claimed in Claim 8, wherein the housing is made of metal.

11. A connector for wires (or the like) as claimed in Claim 10, wherein the housing is a die-cast, interengaging
15 two-part housing provided in one or both parts with location surfaces for the connector and entry and exit holes for wire ends.

12. A connector for wires (or the like) as claimed in any one of Claims 8 to 11, wherein the entry holes diverge
20 outwardly.

13. A connector for wires (or the like) comprising a length of spring steel strip bent into the form of a Z (or N) housed in a hollow body with the diagonal of the Z (or N) constrained against rotation in the mid-plane of the Z (or N),
25 the diagonal having a central aperture allowing passage of oppositely directed wire end portions passing between r spective entry and exit holes in opposite sides of the body, and the arms (or limbs) of the Z (or N) being biased so that

attempted withdrawal of either wire end portion is prevented by gripping action between the end of the respective arm (or limb) and that wire end portion.

14. A connector for wires (or the like) as claimed
5 in Claim 13, wherein the ends of the arms (or limbs) are provided with semicircular or V-shaped notches for positive location with respective wire ends and enhancing the gripping action by increased edge and wire engagement.

15. A connector for wires (or the like) as claimed
10 in either of Claims 13 or 14, wherein the body is made of plastics.

16. A connector for wires (or the like) as claimed
in either of Claims 13 or 14, wherein the body is made of metal.

15 17. A connector for wires (or the like) as claimed
in Claim 16, wherein the body is a die-cast, interengaging two-part body and is provided in one or both parts with location surfaces for the connector and entry and exit holes for wire ends.

20 18. A connector for wires (or the like) as claimed
in any one of Claims 13 to 17, wherein the entry holes diverge outwardly.

19. A connector for wires (or the like) comprising a hollow body having aligned openings in opposite sides for the
25 passing therethrough of oppositely directed wire end portions, and a pair of spring devices located in pockets in the body and biased so that attempted withdrawal of either wire end portion is prevented by gripping action between the respective

spring device and an abutment facing the respective pocket.

20. A connector for wires (or the like) as claimed in Claim 19, wherein each spring device is formed by a bent spring steel strip one limb of which bears against a side of the respective pocket to urge the free end of the other limb towards the respective abutment.

21. A connector for wires (or the like) as claimed in Claim 19, wherein each spring device comprises a compression spring between a side of the respective pocket and a lever arm having one end pivoted in a back corner of the pocket and the other end urged towards the respective abutment.

22. A connector for wires (or the like) as claimed in any one of Claims 19 to 21, wherein the wire engaging ends of the limbs or arms are provided with semicircular or V-shaped notches for positive location with respective wire ends and enhancing the gripping action by increased edge and wire engagement.

23. A connector for wires (or the like) as claimed in any one of Claims 19 to 22, wherein the body is made of plastics.

24. A connector for wires (or the like) as claimed in any one of Claims 19 to 22, wherein the body is made of metal.

25. A connector for wires (or the like) as claimed in Claim 24, wherein the body is a die-cast, interengaging two-part body and is provided in one or both parts with location surfaces for the connector and entry and exit holes

for wire ends.

26. A connector for wires (or the like) substantially as hereinbefore described with reference to Figures 1 to 4 of the accompanying drawings.

5 27. A connector for wires (or the like) substantially as hereinbefore described with reference to Figures 5 and 6 of the accompanying drawings.